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The Independent Evaluation Report (IER) addresses the Operational Test II (OT II) of the Platoon Early Warning System (PEWS) AN/TRS-2( ) conducted by the US Army Airborne, Communications Electronics Board (USAACEBD) at Fort Bragg, North Carolina during the period 30 August 1976 to 15 October 1975. Conclusions developed as a result of the independent evaluation process will be utilized as a basis for development of the TRADOC/USAIS position for the PEWS Development Acceptance In-Process Review (DEVA-IPR) scheduled for 1 June 1977. This evaluation addresses the systems' operational capability, the validity of the logistical concept and the adequacy of the system. Primarily data from OT II is evaluated in this report; however, data from all sources is considered and used where practical.

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CHAPTER 1

EXECUTIVE SUMMARY

1.1 PURPOSE AND SCOPE. The Independent Evaluation Report (IER) addresses the Operational Test II (OT II) of the Platoon Early Warning System (PEWS) AN/TRS-2 ( ) conducted by the US Army Airborne Communications Electronics Board (USAACEBD) at Fort Bragg, North Carolina during the period 30 August 1976 to 15 October 1976. Conclusions developed as a result of the independent evaluation process will be utilized as a basis for development of the TRADOC/USAIS position for the PEWS Development Acceptance In-Process Review (DEVA IPR) scheduled for 1 June 1977. This evaluation addresses the systems operational capability, the validity of the logistical concept and the adequacy of the sytem. Primarily data from OT II is evaluated in this report; however, data from all sources is considered and used where practical. The validity of all data will be examined including test conditions.

1.2 SYSTEM DESCRIPTION. The basic PEWS system as tested in OT II is a lightweight, self-powered, portable intrusion detection device assigned for use by small military units such as patrols, platoons, or squads. The sensors are designed for hand emplacement and unattended operations in forward combat zones. The system is composed of self-contained sensors each capable of detecting personnel and vehicles at ranges up to 15 meters from the emplaced sensors. The system is capable of distinguishing between personnel and vehicle targets. Two types of sensors are used, each of which consists of a combination of detectors. The total number of sensors in a set is nine; however, the number of each type is variable dependent upon mission requirements. The two types of sensors available are:

a. Seismic/Magnetic/Soil Conductance (Type I)

b. Electromagnetic/Seismic/Soil Conductance (Type II)

Upon detection of an intrusion, the sensor, after classifying the intruder (as to man or vehicle), communicates the detection event and the classification data to a remote monitor receiver/display by means of either a RF or a wire link. The communications option is selected as a switch on the PEWS sensor. The remote monitor receiver/display is capable of receiving the RF transmission directly and displaying, by means of lights, the I.D. number of the activated sensor and the classification of the target and providing an audible alert signal to a set of headphones. The receiver performs the same display functions when a wire link is used; however, a wire adapter module is used to interface the communication wire to the receiver. The receiver is completely self-contained when used in the RF mode. The wire module accommodates nine pairs of wires. The wire module uses the same power supply as the receiver when connected to it. The receiver is capable of operating in the RF mode and the wire link mode simultaneously. The sensing wire for the soil conductance detector is deployed from a small dispenser which is capable of holding 500 feet of 36 Army Wire Guage (AWG) wire (uninsulated). A small wooden stake is used to anchor the free end of the sensing wire and to hold it taut.

1.3 LIMITATIONS. Factors limiting the quality and scope of the evaluation and the impact of these limitations are outlined below:

a. Test Site and Test Troops: The OT II for the PEWS was conducted at Fort Bragg with troops from the 82d Airborne Division. The majority of testing was for non-mechanized infantry operations, a very limited amount of data was collected concerning operations in a mechanized environment.

Impact: Minimal - Data collected during DT II and other testing will be utilized for the evaluation. The airborne units Method of Operation provided a realistic environment for the evaluation of PEWS where the majority of employment factors critical to the infantry were tested (portability, RAM, ease of operation, durability, increased reaction time). Sufficient data exists for an accurate assessment of this area.

b. Artillery: No operational testing in an artillery environment was conducted using the PEWS.

Impact: Minimal - Data from DT II and other testing will be used. Sufficient data exists for accurate assessment of this area.

1.4 ADEQUACY OF TESTING. The PEWS OT II provided sufficient operational data for a production decision at the DEVA IPR. By supplementing OT II data with data from DT II, subjective evaluation and ECOM testing, all areas of operational interest have been addressed. Additional operational data will be gained during production testing.

1.5 OPERATIONAL ISSUES. The following operational issues were designated as critical issues for OT II:

a. What is the reliability of the PEWS under operational field conditions?

b. What is the operational availability of the PEWS under operational field conditions?

c. What is the maintainability for the PEWS component/assemblies at the operator and direct support levels of maintenance?

d. Does the availability of the PEWS increase the effectiveness of the platoon in missions of defense, ambush, monitoring lines of communication, and retrograde?

e. Will the employment of the PEWS excessively disrupt normal platoon tactical functions when used in either the RF or wire link mode?

f. Does the PEWS show degradation in its capabilities to detect and classify moving personnel or vehicles under varying environmental conditions?

1.6 ANALYSIS.

a. Testing Results.

(1) During the OT II the PEWS significantly improved the capability of the rifle platoon to accomplish assigned missions. The greatest increase was seen in the following areas:

(a) Increased reaction time - A 100 percent increase in reaction time was experienced over present capability by the majority of the rifle platoons, i.e., the platoon leader knew that aggressors were approaching his area. (Annex B, 2-24)

(b) A 97 percent target detection rate for all targets presented during the five FTXs during OT II. (Annex B 2-23)

(c) All five platoons tested stated the PEWS achieved its primary purpose of providing an early warning capability. (Annex B, 2-29)

(d) Capability to place indirect fire on a target based on sensor readings rather than depending on visual detection was identified during the OT II. (Annex B, 2-25)

(2) Based on data collected during the OT II the training program for the PEWS is satisfactory. This includes both operator and maintenance training. (Annex B, 2-5)

(3) The present platoon organization is sufficient in both strength and MOS to effectively utilize the PEWS. (Annex B, 2-31)

(4) The PEWS did not meet the specified Mean-Time-Between-Failure (MTBF) during OT II. It appears design corrections proposed by PM REMBASS should improve the PEWS reliability above the specified MTBF. These corrections will also improve the operational availability of the system. During the OT II operator personnel and direct support repairman had no difficulty performing maintenance functions. (Annex B, 2-13)

(5) Out of a total of 156 sensors implanted during the OT II five were visually detected by aggressor personnel. In each case of visual detection the sensors had not been properly camouflaged and the aggressor personnel were within the sensor detection radius before visual detection was made. (Annex B, 2-33)

(6) The PEWS had a false alarm rate that exceeded the specified criteria. There were 9 activations for 145.7 hours of operation with the Type I and 93 activations for 102.8 hours of operation with the Type II sensors. The classification of targets criteria was not met during the OT II. While the criteria were not met for the above issues, the effect on operations' performance experienced by the rifle platoons was minimal.

(7) The environmental subtests evaluated the system in: Swampy soil with light and heavy foliage, and firm soil with heavy foliage. Data obtained during the subtests shows:

(a) The soil conductance wire was ineffective over 50 percent of the time. (Annex B, 2-38)

(b) The employment of soil conductance requires too much time and assets. (Annex B, 2-38)

(c) The Type II sensors did not meet any of the detection and classification criteria and are not considered satisfactory for tactical employment. (Annex B, 2-38)

(d) Detection and Classification rates of Type I sensors are considered satisfactory even though the system failed to meet the stated criteria. (Annex B, 2-38)

(8) Three types of wire were used during the OT II for the wire link (WD-1, WD-36, and Sippican). Based on overall results of the test, WD-36 is considered best suited for use under tactical field conditions. (Annex B, 2-31)

b. Additional Areas.

(1) System Configuration.

Three different configurations of the PEWS were tested druing the OT II. The recommended configuration was 2 receivers, 10 sensors, 2 wire modules, 2 headsets, and 2 carrying bags. This configuration provides for better system flexibility and provides more employment options. (Annex B, 2-31)

(2) Logistics.

As a result of the logistics evaluation during the PEWS OT II it was determined that:

(a) The technical manuals require revision. (Annex B, 2-55)

(b) Batteries for the PEWS met the established criteria during the OT II. (Annex B, 2-55)

(c) The Tool Kit TE-33 must be modified to permit use with WD-36 wire. (Annex B, 2-55)

(d) Authorized tools and test equipment were satisfactory and required. (Annex B, 2-50)

1.7 CONCLUSIONS.

a. The Infantry has a requirement for a Platoon Early Warning System (PEWS).

b. THe PEWS provided an effective early warning system.

c. The soil conductance wire and Type II sensor (DT 578) adds very little to the operational effectiveness of the PEWS.

d. The WD-36 wire is best suited for PEWS use.

e. The PEWS should be composed of:

(1) Two Receivers, Radio R-1808.

(2) Ten Detectors, Anti-Intrusion, IT-577.

(3) Two Sensor Interfaces, Wire Link, MX 9738.

(4) Two Grounding Stakes.

(5) Two Headsets Patrol Seismic Intrusion Detector (PSID).

(6) Two Carrying Cases.

f. The PEWS reliability must be improved and demonstrated prior to fielding.

g. THe logistical shortcomings must be corrected and demonstrated prior to fielding.

1.8 OPERATIONAL EFFECTIVENESS/MILITARY UTILITY.

a. The PEWS will make a significant contribution to the ability of the rifle platoon to accomplish assigned missions. Presently, with the exception of Listening Posts/Observation Posts, the rifle platoon does not have an early warning capability. All night observation devices in the field and being developed are dependent on available light and/or line-of-sight restricted. While the PEWS did not meet all established criteria during OT II it did provide the rifle platoon a capability that is not presently available. All of the platoons using the PEWS stated that they would accept the system as it is presently designed.

b. The PEWS will also add to the ability of the Military Police (MP) Corps to accomplish assigned missions. The MP Corps can use PEWS when in support of infantry, and in special missions of rear area security such as monitoring roads and wooded areas, monitoring the terrain surrounding nuclear weapons storage and other high value temporary storage locations, and monitoring the terrain surrounding command posts.

CHAPTER 2

DETAILED EVALUATION

2.1 AUTHORITY. THis Independent Evaluation Report is being prepared by the USAIS as required by TRADOC Regulation 71-9 dated 31 December 1975.

2.2 PURPOSE AND SCOPE. Conclusions developed as a result of the Independent Evaluation process will be utilized as a basis for development of the USAIS/TRADOC position for the DEVA IPR in June 1977. Decisions to be made at the IPR include:

a. The system configuration to include the requirement for Type II sensors, soil conductance wire, type of field wire for PEWS use and number of PEWS receivers in each system.

b. Type classification action.

c. Design changes to PEWS components.

d. Additional test requirements.

2.3 BACKGROUND.

a. Requirement - The PEWS requirement was stated in a letter, CDCMR-E, USACDC, November 1972, subject: DA Approved Small Development Requirement for Platoon Early Warning Device (PEWD).

b. System Description - See paragraph 1.2.

c. Intended Operational Capability - The Infantry has a longstanding requirement for early warning devices. This requirement has been satisfied in the past by trip flares and such crude field expedients as tin cans containing pebbles affixed to trip wires and/or barbed wire, use of listening posts/outposts and other means available to the small unit leaders. These expedients, although partially effective do not constitute a reliable early warning system to the Infantry. Currently, all early warning or surveillance devices are dependent upon line-of-site employment and are hampered by adverse weather and vegetation conditions. The employment of the PEWS will permit coverage of areas impossible to survey with current line-of-site devices, and provide early warning to the rifle platoon. Requirements for more sophisticated perimeter intrusion detection systems have a firm doctrinal base in FM 19-30 Physical Security. When environment and/or economic considerations do not permit installation of more sophisticated equipment (e.g., electromagnetic fencing), a reliable device, which may be installed quickly and utilized to give early warning of intrusion attempts to perimeter security guards of classified operating areas and sensitive logistical facilities, is needed.

d. Current Status - Engineering Development of the PEWS is complete and the DEVA IPR is scheduled for 1 June 1977. The major developmental problem is the high false alarm rate of the DT-578 (Type II) sensor and the ineffectiveness of the soil conductance wire.

e. Summary of Testing - DT II for the PEWS was conducted at US Army Electronic Proving Ground, Fort Huachuca, Arizona, during the period July-November 1976. The OT II was conducted by the US Army Airborne, Communications and Electronics Board, Fort Bragg, North Carolina, during the period August-November 1976. Five test platoons, 1 each week, were provided by the 82d Airborne Division. The platoons averaged 75 percent of the authorized TOE strength.

f. Other Evaluations - To supplement the PEWS OT II Test Report; data from the DT II, ECOM testing, and other testing will be used in the IER. When other than OT II data is considered it will be so noted.

2.4 LIMITATIONS. All critical issues were answered in OT II. Additional data is needed on enviornmental testing prior to fielding the system. This data will be collected during environmental testing planned for the next phase of development.

2.5. ADEQUACY OF OPERATIONAL TESTING. Reference page 1-2, paragraph 1.4.

2.6 THREAT. The threat is contained in TRADOC Scenario European I Sequence 2A and portrays both a mounted and dismounted threat against the Infantry Platoon. The IER evaluates data collected in OT II to determine the increased capability for surveillance and target acquisition provided by the PEWS against such a threat.

2.7 ANALYSIS.

a. General Approach - The operational issues were developed by the USAIS. Foremost during development of the operational issues were the questions; what increased capability will the PEWS provide the infantry platoon, and what criteria must the system meet to fulfill the requirement? The establishing of criteria was extremely critical as there is no system currently in the inventory that could be used as a baseline.

b. Critical Operational Issues.

(1) What is the reliability, availability and maintainability of the PEWS under operational conditions?

(a) Identified as critical issues because of the direct bearing on the essential functions of the system.

(b) Issues were answered during the PEWS OT II.

(2) Does the availability of the PEWS increase the effectiveness of the platoon to accomplish assigned missions?

(a) Issue answers the question whether the PEWS is required and what benefits can be obtained from utilization of the system.

(b) Issue was answered during the PEWS OT II.

(3) Will the employment of the PEWS excessively disrupt normal platoon tactical functions when used in either the RF or wire link mode?

(a) Issue is critical because of the direct bearing on the utility and value of the system to the infantry platoon.

(b) Issue was answered during the PEWS OT II.

(4) Does the PEWS show degradation in detection or classification capabilities under varying environmental conditions?

(a) Issue is critical because worldwide use is planned for PEWS.

(b) Data was obtained on this issue during OT II but will have to be supplemented by data from DT II, ECOM and environmental testing.

c. Operational Issues - The operational issues were taken from the Outline Test Plan, and Coordinated Test Program, developed by the USAIS. Operational Issues are listed at Annex, Appendix B.

d. Evaluation of Operational Issues.

(1) Does the training program provide the instruction necessary for the deployment and operation of the PEWS?

Analysis:

The training program used during OT II was satisfactory. The training program was presented in six hours.

(2) Does the training program provide the instruction necessary to interpret data from the PEWS?

Analysis:

The COI presented by the USAIS instructor was satisfactory. However, the performance of the platoon improves with field experience. Test Platoon leaders stated that an additional 2 days to 2

weeks (outside limits) use in the field would be required to realize the maximum efficiency of the PEWS. The integration of the PEWS into FTXs will satisfy the need for field experience.

(3) Can maintenance personnel having an MOS of 26C perform direct support maintenance by using the tools, test equipment and maintenance literature provided without additional training?

Analysis:

The MOS 26C was not evaluated during OT II. A waiver was obtained from HQ TRADOC and MOS 31E (Field Radio Repairman) was utilized as the DS repairman MOS during OT II. No problems were encountered using the tools, test equipment, and maintenance literature for DS procedures.

(4) Does the PEWS provide an effective detection capability against vehicle and personnel targets for normal platoon missions?

Analysis:

(a) The Type I sensor met the detection criteria for personnel and detected in excess of 90 percent of the vehicular targets. Type II sensors detected only 67 percent of the tracked vehicles and 85 percent of the wheeled vehicles and only met the criteria for detection of personnel in 1 of 3 areas tested. The overall detection rate for TYpe I was 89 percent and 85 percent for Type II sensors.

TABLE 2.1 DETECTION RATES

	(%) Type I	Type II	Criteria
*1 Person	80	38	75
3 Personnel	88	93	85
Wheeled Vehicles	93	85	95
*Tracked Vehicles	91	67	95
Overall	89	85	

*Suspect due to sample size

(b) The PEWS provided an effective detection capability for the rifle platoon during the OT II. This is especially true for the Type I sensors which outperformed the Type II sensors in 3 of the 4 areas tested. The Type II sensor provides no apparent improved detection capability over that which can be achieved with the Type I.

(5) Does the PEWS accurately classify detected targets?

Analysis:

(a) The overall classification for both type sensors was 86 percent. The Type I classified vehicles 7 percent better than the Type II but the Type II classified 3 percent more personnel targets correctly than Type I.

TABLE 2.2 CLASSIFICATION RATES

	(%) Type I	Type II	Criteria
Personnel	86	89	95
Vehicles	86	79	90
Overall	86	86	

(b) While the two types of sensors were equal in overall classification, the Type I classified critical targets better than the Type II, i.e., vehicles. The classification rate of the Type I sensor was satisfactory for field operations.

(6) Is the PEWS false alarm rate acceptable under operational field conditions?

Analysis:

(a) The false alarm rate for the Type I sensor was .062 false alarms per sensor per hour and for the Type II was .905 false alarms per sensor per hour.

(b) Out of the 124 fire missions requested by the platoon leaders during the OT II only 1 mission was requested on a sensor false alarming. The high false alarm rate of the Type II sensor would limit the tactical utility of the PEWS. Based on conversations with PM REMBASS it would be an extremely high risk development to correct the Type II sensor false alarm problems.

(7)* What is the reliability of the PEWS under operational field conditions?

Analysis:

(a) The MTBF during OT II was 52.3 hours for the wire mode and 68.5 hours for the RF mode. This does not meet the required MTBF of 165 hours.

(b) A system failure was defined as when any major component failed to operate properly, i.e., receiver, wire module, Type I or Type II sensor. This implies that if one of nine sensors fails the system is useless.

TABLE 2.3 RELIABILITY

COMPONENT	TOTAL HOURS	CHARGEABLE FAILURES	COMPONENT MTBF
R-1808	681.2	5*	136.2
DT-577	3358.3	1	3358.3
DT-578	1646.2	3	548.7
MX-9738	221.3	1	221.3

*Failures were earphone failures

(c) Based on proposed design changes it appears to be low risk in meeting the MTBF prior to fielding; however, this will require verification testing.

(8)* What is the operational availability (AO) of the PEWS under operational field conditions?

Analysis:

(a) The PEWS A_O is 83.3 percent for the wire mode and 88 percent for the RF mode. The requirement states the PEWS A_O shall be at least 95 percent.

(b) With improvement in the reliability of the PEWS the A_O will improve likewise. It appears that a very low risk is involved in meeting the PEWS A_O prior to fielding. However, this will require verification testing.

(9)* What is the maintainability for the PEWS component/assemblies at the operator and direct support levels of maintenance?

Analysis:

(a) At the operator level the MTTR is 2.55 minutes and at DS level is MTTR 20.3 minutes.

(b) Although no MTTR is specified in the requirements document, it is the opinion of the test organization that the demonstrated MTTR will not impose any maintenance hardships in an operational environment.

(10) Can the PEWS be packed with a parachutists's individual equipment and jumped without excessive damage to the PEWS?

Analysis: THe PEWS was airdropped a total of 15 times and was 100 percent operational after each airdrop.

(11) Can the PEWS be packed in equipment bundles and air delivered without excessive damage to the PEWS:

Analysis: THe PEWS sustained no damage during 15 airdrops and was 100 percent operational after each airdrop.

(12)* Does the availability of the PEWS increase the effectiveness of the platoon in missions of defense, ambush, monitoring lines of communications and retrograde?

Analysis:

(a) The PEWS provided at least an 100 percent increase in reaction time over the present means of aural or visual detection.

TABLE 2.4 TARGETS DETECTED DURING TACTICAL EXERCISES

MISSION	PERCENT OF TARGETS DIRECTED
Defense	100
Road Junction Monitoring	94
Ambush	90
Retrograde	100
Overall	97

(b) The PEWS detected 97 percent of the targets presented during the FTX. Fire missions requested by the platoon leaders resulted in 77 percent of the coordinates of the detection being within 50 meters of the target.

(13)* Will the employment of the PEWS excessively disrupt normal platoon tactical functions when it is used in either the RF or wire link mode?

Analysis:

(a) When used in the wire mode the receiver (platoon headquarters) is restrictive in much the same way a TA-1 telephone would be restricted.

(b) With the exception of one fire mission based on a false alarming sensor, there were no detrimental tactical activities undertaken as a result of using the PEWS.

(14) Are any modifications required to the personnel authorization of the Airborne Infantry Platoon with respect to number, skill level, MOS or billet?

Analysis: Test platoons were operating at approximately 75 percent strength and were able to effectively employ the PEWS.

(15) Are any modifications required to the equipment authorization for the platoon in order to effectively employ the PEWS?

Analysis: Present platoon communications are not satisfactory for PEWS employment. This will be corrected when the Small Unit Transceiver (SUT) is introduced into the inventory.

(16) Does the PEWS affect or is it affected by, the operation of any other items of infantry company or platoon level communications electronics equipment?

Analysis: No interference was noted during the PEWS OT II.

(17) Are the PEWS sensors easily detectable by the enemy?

Analysis:

(a) Five sensors were detected out of a total of 156 used during the FTXs.

(b) In each case of visual detection the sensor had not been properly emplaced or camouflaged

and the aggressor personnel were within the sensor's detection radius prior to visually locating the sensor.

(18)* Does the PEWS show degradation in its capability to detect moving personnel under varying environmental conditions?

Analysis:

(a) The soil conductance detector (wire) was ineffective over 50 percent of the time and took 5 personnel 2 hours to emplace the wire for 15 sensors.

(b) The Type I sensors performed better during environmental testing for detection of personnel.

(19)* Does the PEWS show degradation in its capability to detect moving vehicles under varying environmental conditions?

Analysis: The Type II sensors detected 90 percent of the vehicular targets compared to 85 percent for the Type I sensor during the environmental test.

(20)* Does the PEWS show degradation of its classification capabilities under varying environmental conditions?

(a) Classification rate for Type II sensor was only 56 percent in swampy soil and heavy foliage for personnel.

(b) The detection and classification rates for Type I sensors are considered satisfactory for operational use.

TABLE 2-5 ENVIRONMENTAL TESTING DETECTION AND CLASSIFICATION RATES

	Swampy Soil and Heavy Foliage	
DETECTION	TYPE I	TYPE II
1 Person	75	58
3 or more Personnel	58	50
Wheeled Vehicles	83	91
CLASSIFICATION		
Personnel	91	56
Vehicles	85	96

	Firm Soil and Heavy Foliage	
DETECTION	TYPE I	TYPE II
1 Person	81	72
3 or more Personnel	88	69
Wheeled VEhicles	84	90
CLASSIFICATION		
Personnel	96	99
Vehicles	90	62

(21) Are the controls on the PEWS engineered to conform with human engineering factors?

Analysis:

(a) The PEWS met the criteria with only minor exceptions.

(b) Aggressor personnel reported no audio or visual detections of the monitor/receiver.

(c) Toggle switches on the sensors were bent by excessive pressure.

(22) Are the visual displays and audio signals engineered to adequately conform with human engineering factors?

Analysis: The visual displays and audio signals were easy to observe and understand.

(23) Are the control functions engineered to conform with human engineering factors?

Analysis: The functions are apparent and do not require an excessive degree of concentration to monitor.

(24) Is the PEWS designed to minimize electrical hazard to personnel?

Analysis: No hazards were observed during OT II.

(25) Is the PEWS designed to minimize safety risks associated with handling?

Analysis: There were no injuries or observed safety hazards during the OT II.

(26) Are there significant differences in the performance characteristics of the three types of wire when used as the wire link?

Analysis:

(a) Both WD-1 and WD-36 transmitted messages in excess of 1500 meters.

(b) While the lightweight wire is dependable at shorter ranges, problems were experienced at 1500 meters.

(27) Which type of wire is best suited for use under tactical field conditions?

Analysis:

(a) Based on the results of the OT II the WD-36 is best suited for use under tactical conditions.

(b) This is based on size, weight, strength and performance of the wire when serving as the PEWS wire link.

(28) Do the draft equipment publications provide the information required?

Analysis:

(a) The publications do not contain information for proper system tactical deployment and information required to requisition repair parts.

(b) Manuals require updating to reflect PEWS design changes.

(29) Can the PEWS be supported with repair parts, tools, and test equipment authorized?

Analysis:

(a) Manuals require updating to reflect the current design of PEWS and parts necessary for PEWS maintenance.

(b) Test equipment is satisfactory and necessary.

(30) What is the battery usage associated with normal operation?

Analysis: Based on OT II data a new set of batteries will support a 9-day mission in a warm climate.

TABLE 2.6 BATTERY LIFE

ITEM	BA-3090	BA-90
DT-577	672 hrs	552 hrs
DT-578	600 hrs	504 hrs
R-1808	240 hrs	240 hrs

a. Each sensor activated once per hour

b. Temperature range 60 degrees to 101 degrees (F).

2.8 DISCUSSION:

a. Tactics - The Small Development Requirement (SDR) for the PEWS was initiated in 1968 and addressed existing operational requirements. Since the initiation of the requirement tactics and doctrine have undergone major changes. The PEWS OT II was conducted using the European Scenario and emphasized current tactical thinking. The OT II revalidated the need for the PEWS to support infantry operations on the modern battlefield as outlined in FM 100-5. PEWS will greatly assist the commander by:

(1) Providing a means to see the battlefield.

(2) Allowing units to cover greater areas.

(3) Supporting continuous combat operations.

(4) Providing increased reaction time for repositioning weapons systems at the lowest operating level.

(5) Increasing the effectiveness of organic indirect fire capabilities.

(6) Increasing the security of units in the battle area.

b. Decision Points: The decision body (IPR) will be required to decide not only whether to procure or not procure the PEWS but also the issues outlined below. The OT II addressed different types of system configurations, wire, and identified components of the system that were marginal in performance. It appears that the following will be decision points for the IPR:

(1) System configuration.

(2) Type of wire to be used for wire mode.

(3) Type of headset to be used for the PEWS.

(4) Verification of design changes.

(5) Additional test requirements.

Alternatives for each of these areas with advantages and disadvantages are contained in Appendix A.

c. User acceptability. During the OT II the Platoon Leaders (5) were queried on the PEWS and its intended use. The Platoon Leaders replied that the PEWS performed its primary purpose and they would feel confident using system in combat. In addition to the OT II the PEWS was loaned to the Sensor Platoon from the 82d Airborne Division for use during a deployment exercise (Brave Shield) to Eglin Air Force Base, Florida. During one phase of the exercise the PEWS was employed for six days with 52 activations (all confirmed targets) and two false alarms. All who were associated with the PEWS during the exercise were favorably impressed with the system's performance.

2.9 SENSITIVITY ANALYSIS. The issues most sensitive to the overall evaluation are:

a. The increase in effectiveness of rifle platoon when PEWS is utilized.

b. Degradation of the system under varying environmental conditions.

c. The false alarm rate.

d. The detection and classification capability of the system.

The data contained in the OT II test report is correct as it relates to these issues. The major issue is that the PEWS significantly improved the effectiveness of the rifle platoon. While the criteria for all the issues were not met, the effectiveness of the system was demonstrated in OT II.

2.10 FINDINGS:

a. That sufficient data is contained in the PEWS OT II Test Report for the independent evaluation.

b. That the COI is satisfactory for formal training; however, optimum proficiency can only be attained through field experience.

c. That the PEWS supports combat operations as outlined in FM 100-5.

d. That the rifle platoon can effectively operate the PEWS.

e. That the present PEWS reliability is not satisfactory for infantry use.

f. That the Type II sensor and soil conductance wire are not acceptable in present design for infantry use.

g. That the PEWS as presently configured does not provide for maximum utilization.

h. That the PEWS TMs are unsatisfactory.

i. That design corrections on the PEWS must be made in production and verified during testing.

j. That the PEWS significantly increases the combat effectiveness of the rifle platoon.

2.11 CONCLUSIONS.

a. That the PEWS be composed of:

(1) Two Receivers, Radio, R-1808.

(2) Ten Detectors, Anti-Intrusion, DT-577.

(3) Two Sensor Interfaces, Wire Link, MX-9733.

(4) Two Grounding Stakes.

(5) Two Carrying Bags.

(6) Two Headsets PSID.

(7) Two Operator Manuals.

b. That the PEWS reliability must be improved and verified prior to fielding.

c. That the PEWS TMs must be updated and verified prior to fielding.

d. That the PEWS is required to support infantry operations as outlined in FM 100-5.

ANNEX A

PEWS DEVA IPR ALTERNATIVES

1. System Configuration: Two PEWS configurations were evaluated during OT II. The basic system, 1 receiver, 1 wire module, 9 sensors and a configuration of 2 receivers, 10 sensors, 2 wire modules and 2 carrying bags. All of the test platoons preferred the 2 receiver configuration.

ANALYSIS: The 2 receivers, 10 sensor, 2 wire modules and 2 carrying bags provides for a more flexible system with a built in redunancy. This configuration would permit for a greater operational utility of the system. An example of this would be a platoon in defense that also must provide an anti-armor ambush. In this case the platoon leader would have a receiver and the ambush leader would have a receiver. The major disadvantages to the 2 receiver configuration will be:

a. An increase in cost, approximately $250 per system.

b. An increase in system weight approximately 5 pounds.

CONCLUSION: The 2 receiver configuration will provide a better system to the infantry.

2. PEWS Wire Link.

Characteristics of Candidate Wire:

	WEIGHT	RANGE*	RELIABILITY
WD-1	(1/2 mile) 26.5 lbs	1500	100 percent
WD-36	(1/2 mile) 4.2 lbs	1500	100 percent
Sippican	(1500 mts) 2.1 lbs	1300 meters	75 percent

*DT II Test Data

ANALYSIS: During testing the WD-1 and WD-36 met all criteria. The Sippican Wire was not reliable out to the required range and broke during installation. While the Sippican Wire does offer a significant reduction in weight the wire is not durable enough for field use. Army acceptance of the wire would require strengthening and redesign which would involve development time and money. Also, the Sippican Wire is not reusable and cannot be spliced. WD-1 and WD-36 are both in the inventory and have been utilized by units in the field.

CONCLUSION: WD-36 best meets the infantry operational requirements.

3. PEWS Headset:

Three types of headsets were evaluated for PEWS use with the monitor/receiver.

a. AN/PRR-4/PRT-9 Earphone.

b. Patrol Seismic Intrusion Detector (PSID) Earphone.

c. Commercial Earphone.

ANALYSIS: In both DT II/OT II the PSID was the most reliable and preferred headphone. The PSID headphone does not meet the SDR of having adjustable volume. This did not impact on the operational utility of the earphone during the OT II. The earphone was fielded approximately 8 years ago for use with the PSID.

CONCLUSION: The PSID earphone is satisfactory for use with the PEWS.

4. Verification of Design Changes: Several problems were identified during DT/OT II and different configurations of the system were tested.

ANALYSIS: Based on data gathered during OT II the PEWS will increase the infantry's capability. The design changes identified during DT/OT II will further increase this capability. Changes identified are not serious enough to delay production but require verification as part of the production process.

CONCLUSION: The design changes can be verified using production models of the PEWS.

5. Requirement for Soil Conductance Wire: The soil conductance wire is designed to detect creeping or crawling personnel.

ANALYSIS: Due to the change in tactics and the threat, the utility of the wire is questionable. As presently designed the wire is not satisfactory for infantry use. It takes to long to install, breaks easily, and has a low detection rate. Elimination of the wire will result in a significant cost savings.

CONCLUSION: The soil conductance wire should be eliminated from the PEWS.

6. Type II Sensor: Three Type II sensors are currently in each PEWS. The sensor provides a Electromagnetic/Seismic detection capability and is used in loose or rocky soil and in ice, snow and frozen ground.

ANALYSIS: In both DT/OT II and ECOM testing the Type I sensor has outperformed the Type II sensor. The Type II sensor is the most costly of the two types of sensors. Testing has not shown any advantage of having the Type II sensor in the system. Elimination of the Type II sensor will reduce the logistical support required for the system as only one type will have to be stocked and maintained.

CONCLUSION: The Type II sensor should be eliminated from the PEWS.

ANNEX B

TEST REPORT

Previously Provided

ANNEX C

SMALL DEVELOPMENT REQUIREMENT FOR THE PLATOON EARLY WARNING SYSTEM

CDCMS-M 19 October 1972

SUBJECT: Approved Change 2 to Department of the Army Approved Small Development Requirement for a Platoon Early Warning Device (PEWD) (U)

SEE DISTRIBUTION

1. Reference.

a. Letter, DARD-DDS, HQ DA, 7 Oct 71, subject: Minutes and Recommendations of Special In-Process Review on Platoon Early Warning Device (PEWD).

b. Letter, DARD-DDS-S, HQ DA, 28 Aug 72, subject: Minutes and Recommendations of Coordinated Test Program In-Process Review on the Platoon Early Warning Device (PEWD).

c. Letter, CDCMR-E, HQ USACDC, 25 Nov 68, subject: DA Approved Small Development Requirement for Platoon Early Warning Device (PEWD) (GDOG Para 29b(1), Appendix E) (U).

2. In accordance with references 1a and b, the PEWD SDR has been changed and is attached as Inclosure 1. This change supersedes Inclosure 1 to reference 1c.

3. Proponent materiel and combat developers will insure coordination and coincidence of the PEWD SDR and the Remotely Monitored Battlefield Sensor System (REMBASS) requirement document where possible.

4. This action is identified with USACDC ACN 7800.

FOR THE COMMANDER:

1 Incl
as

WILLIAM POWELL, JR.
CPT, AGC
Asst AG

DISTRIBUTION:
"See page 2"

Department of the Army (DA) Approved Small Development
Requirement for Platoon EArly Warning Device (PEWD)

1. CDOG Paragraph Number. 29b(1) (Appendix E)

2. Purpose and Operational Characteristics.

a. Purpose. To provide early warning of approaching personnel and vehicles to platoon and outpost size units conducting defensive and ambush type operations. The effectiveness of such operations is often dependent upon the ability of small units to deliver a large volume of accurate planned fire before the enemy can mass his own fires. The nature of defensive and ambush operations requires early warning of impending action to realize maximum surprise and effectiveness of organic and supporting fires. An additional need exists for intrusion detection devices which can be used by military police physical security units in supplementing local security for classified operating areas and sensitive logistical facilities. A means of alerting security guard personnel of intrusion or attempted intrusion into an area materially increases the capability of a unit to provide effective security.

b. Operational Characteristics. A simple, compact, lightweight, early warning device, utilizing a control unit and sensors capable of detecting movements of objects on the surface of the earth and/or other sensors not limited to line-of-sight emplacement, is required to supplement line-of-sight dependent equipment, such as passive viewing devices and radars currently authorized infantry units. Military police physical security units will use the described device when the installation of permanent or semi-permanent and more sophisticated intrusion devices is not feasible. All characteristics listed are essential unless otherwise stated. Sophistication is not desired in this device and the development of the item must emphasize use by average infantry and military police personnel without the benefit of specialist training.

(1) Configuration.

(a) Weight of the platoon early warning device (PEWD), including power supply if required, and carrying case must not exceed 13 pounds: (less weight of field wire and grounding stake).

(b) The volume of the carrying case, with all equipment for supplement, less necessary wire and ground stake must not exceed 376 cubic inches, consistent with human engineering.

(c) The control unit must not exceed 200 cubic inches, consistent with human engineering.

(d) The carrying case, including the device, must be compatible with existing load carrying equipment of the infantry platoon.

(e) Sufficient sensors must be provided as part of one device to ensure early warning over at least a 250 meter linear trace along the perimeter.

(f) Rugged, lightweight headphones must be provided as a component of the device.

(g) Power for the device, must be furnished by an expendable type of power source in the Army inventory during the period the equipment is fielded.

(h) The device must be properly fused to prevent damage to the control set in the event the system is subjected to high voltages capable of causing damage to the operator or circuit of the system.

(i) A ground rod, or other means must be provided to lessen danger to the operator and equipment while operating during electrical storms.

(j) The control unit must:

1. Provide an aural warning of sensor activation to be used at operator's discretion. A volume control must be provided to adjust the aural signal level.

2. Provide a convenient, easily read, line check for the individual emplaced sensors.

3. Provide a visual alarm to indicate which sensor's are being activated. Visual alarm will remain activated until manually reset by the operator.

4. Incorporate a sutiable, convenient writing and erasing surface, for pencil, pen or crayon,

for the sketching of the circuit diagram of sensor emplacement.

5. Be capable of connection with other control sets to enable "console" employment when required.

(2) Performance.

(a) The sensors must:

1. Detect, with maximum reliability, but not less than 75 to 85 percent a single person creeping at a distance of 10 to 20 meters from the emplaced sensors, on dry, damp, or wet soil; dry, damp or wet sand; on frozen or grassy soil, or on six inches of snow.

2. Detect, with maximum reliability, but not less than 85 to 90 percent, a group of three persons, separated not over three meters from each other, creeping or walking at a distance of 10 to 20 meters from the emplaced sensors, on dry, damp or wet soil; dry, damp or wet sand; on frozen or grassy soil, or on six inches of snow.

3. Be capable of being buried and/or camouflaged by other methods without degrading performance. Buried sensors shall be capable of being repeatedly reburied without adversely affecting performance.

4. Be of such low cost and such simplified design and construction that a sensor which becomes defective can be considered a throw-away item.

(b) The control unit must:

1. Be simple to operate and emplace.

2. Permit the emplacement of sensors in order to provide early warning as far as 100 to 1500 meters from the control unit utilizing either an RF or wire link.

3. Provide a volume control on the aural signal which is capable of adjusting from zero aural output to detection of the audio signal at a distance of 10 meters from the control unit.

4. Include visual display of sensor activation; this display must n be detectable forward of the control unit and must not be detectable at a distance greater than five meters in any direction from the control unit with the naked eye.

5. Contain all power sources required, to operate the control unit.

6. (Desirable) Provide an cannot read paragraph

(c) The control unit and sensors of the PEWD will be linked, at the discretion of the user, by either an RF link or by standard Army field wire or any electrical wire available in the field at the time. The wire link shall be capable of transmitting 3,000 to 1,500 meters. The weight of such wire (and ground stake) will not be included in the maximum allowable weight of 8-13 pounds.

(d) When operating in the RF mode, the operator should have the capability to select alternate channels (4 to 6 channels are required).

(e) The device shall be able to classify the intrusion as being made by personnel or vehicles.

(f) If sensitivity adjustment is required, then not more than three levels of adjustment shall be provided.

(g) Each sensor will be identified, during activation, by an ID number which will be displayed on the control unit.

(3) Reliability and Durability.

(a) The PEWD must be sufficiently durable to withstand field and combat use by infantry rifle platoons. The PEWD system must have a minimum reliability of 95 percent in successfully completing a mission of 12 hours duration. Failure is defined as inability of a mechanical, electrical, or electronic component to perform its intended function when assembled, or installed properly. Battery failure shall not constitute equipment failur . 165 Hrs MAV.

(b) The device (including appropriate battery) must be capble of satisfactory performance as specified in climatic categories 1 through 6 and also (excluding battery) be capable of satisfactory performance after two (2) years of storage and transportation in the climatic categories started above.

(c) The device must be capable of withstanding the shocks incurred in parachute delivery when carried by an individual parachutists or when dropped by parechute in aerial delivery containers, provided normal precautions imposed by the characteristics and capabilities of the airdrop or air landed systems with which they will be used AR 70-39.

(d) (Essential) The sensors and control unit will be constructed in such a manner so that the only individual (operator) maintenance required is care and cleaning and the replacement of power source, if required. (Desirable) Replacement of defective sensors shall be simple enough that it is within the operator's capability.

(e) Battery life, if batteries are required, must exceed 150 hours at 100 activations per day of continuous operation; 500 hours (desirable). This life is based on manual extinction of the indicating lamps required by 2b(1) (j) 3 not more than ten seconds after each visual alarm.

(f) The device must be waterproof in the storage and operating modes and resistant to fungus, the corrosive effects of chemical agents and salt water spray.

(g) The device must be electromagnetically compatible with the operational environment. It must not radiate undesired electromagnetic energy of sufficient magnitude to degrade performance of sensitive materiel within its area of influence, or be susceptible to enemy detection by monitoring emitted electromagnetic energy.

3. Supporting Justification and Data.

a. Applicable CDOG paragraph are 210b(3), 1510a(1) and 1510a(1) (b).

b. Several private industrial firms have manufactured production models of equipment of this general type. Developmental costs are unknown but should be low since developed equipment exists which is capable of satisfying almost all of these requirements.

c. Required type and amount of materiels which may not be readily available for current war production - none.

d. Technical feasibility of developing and producing, the item by the time required. Development of this item is within the state-of-the-art and is technically feasible. Micro-electronics will be considered for use in the PEWD.

e. Costs data (Estimated).

(1) RDT&E development costs: $250,000.

(2) Prototypes - $5,000 each.

(3) Production items.

(a) Lots of 100 including tooling costs: $1,500 each.

(b) Lots of 1000 including tooling costs: $1,000 each.

f. Comparison with existing equipment and indication of standard items to be replaced. The device will be a new item, therefore, it will not replace any standard item currently in use; however, it will be used with and supplement radars, and binoculars.

g. Consideration of human factors, including qualitative and quantitative personnel requirements. Employment of the device will require only unit level familiarization training. No additional personnel will be required to use or maintain the device at unit level. Direct support and general support maintenance personnel may require limited on-the-job training in the repair. Safe use of the system will require minimum skill. Employing, maintaining, storing and shipping the device will present no health or safety hazards to using personnel.

h. Estimate of quantity required under existing priorities and production capability: 4000 units. US Continental Army Command will require 24 platoon early warning devices for training

purposes.

i. Consideration of probable maintenance effort - Familiarization with preventive maintenance, inspection and safety procedures will be required. No new maintenance skills will be required at the user level; direct support and general support maintenance will require familiarization-type training to perform anticipated maintenance. No additional maintenance personnel will be required at any level.

j. Assistance required from other developing agencies - none.

k. Conflicts with other projects in the use of manpower or facilities - none.

l. Australian, British and Canadian Armies have expressed informal interest and wish to be kept informed on development progress.

m. Comparison with existing or developmental items of allied nations - the British Army has developed and tested the TOBIAS, which furnishes aural and visual signals requiring excessive operator attention and interpretation, rather than definite alarms. It does not meet the requirements of low false alarm rate, console connection, and open circuit alarm, also its reliability and durability are unknown (based on USAMERDC evaluation 3 June 1966).

n. The battlefield environment of the infantry platoon is the environment in which the PEWD is to be employed and should be considered in tests.

o. Basis or issue and planned distribution. One PEWD per infantry platoon should provide sufficient coverage to detect approaching personnel over main avenue of approach into defensive areas or ambush sites. Four devices per military police security platoon will enable employment with established physical security posts of classified and other sensitive areas.

p. Areas of possible simplification of design through application of value engineering techniques without jeopardy to the primary function of the equipment, when total cost might be reduced significantly - none.

4. Recommended Priority. The complete void currently existing in early warning devices, not limited by line-of-sight in infantry and military police units justifies the establishment of priority I for this developmental item.

5. Maintenance Concepts. Properly constructed, sealed units will result in unit maintenance of only care and cleaning and replacement of power sources, if required.

a. The operator, if required to replace power sources, shall be able to do so in no more than 5 minutes, without the use of any tools.

b. Sensors shall be replaceable by direct support personnel in no more than fifteen (15) minutes each.

c. Scheduled maintenance shall be required no more than once in six months, at direct support level, and none required at general support level.

d. In the event of failure which requires direct or general support, the mean time to diagnose and repair shall be no more than two hours. This shall apply to all unscheduled maintenance actions other than sensor replacement.

6. Background Information:

a. The Infantry has had long-standing requirements for early warning devices. These requirements have been satisfied in past and present conflicts by trip flares and by such crude field expedients as the cans containing pebbles affixed to trip wires and/or barbed wire, use of forward listening posts and other means available to the small uit leaders. These expedients, although partially effective in given situations, fail to provide a reliable early warning system to the Infantry. The current conflict in Vietnam has reemphasized the need for a reliable early warning device at the small unit level for the Infantry. Current doctrine emphasized offensive actions. The hours of darkness are often devoted to defensive operations to permit rest and resupply. The fire superiority available to US forces is normally best utilized in daylight operations; therefore, future conflicts in many operational areas may be characterized by day attacks and night defensive perimeters. In order to ensure adequate rest during defensive postures, early warning devices are necessary. These devices will augment listening posts and outposts, permitting better coverage with

fewer individuals required to be alert. Currently, all early warning or surveillance devices are dependent upon line-of-sight employment and are hampered by adverse weather and vegetation conditions. The employment of the PEWD will permit coverage of areas impossible to survey with current line-of-sight dependent devices, ensure adequate early warning to the rifle platoon and permit the individual infantryman to better utilize time allotted for rest and resupply without sacrificing necessary security - Military Police requirements for more sophisticated perimeter intrusion detection systems have a firm doctrinal base in FM 19-30. When environment and/or economic considerations do not permit installation of more sophisticated equipment (e.g., electromagnetic fencing), a reliable device, which may be installed quickly and utilized to give early warning of intrusion attempts to perimeter security guards of classified operating areas and sensitive logistical facilities, is needed.

b. A large number of devices, developed by the US Army and other DOD elements, may be readily adapted to meet this requirement with little additional development. The entire range of seismic, acoustic, infrared, ultraviolet and magnetic anomaly intrusion detection devices should be considered by the developer in meeting this requirement. All other technical approaches which appear to be able to provide the characteristics will be considered, also.

c. In case of competing characteristics the developing agency will give priority in the following order:

(1) Performance.

(2) Simplicity of operation.

(3) Reliability.

(4) Weight and durability.

d. If, during the development phase, it appears to the developing agency that characteristics listed herein require incorporation of certain impracticable features and/or unnecessarily expensive components or devices, constantly manufacturing methods or processes, critical materials, or restrictions which do not enhance the military value of the equipment, such matters will be brought to the immediate attention of the Chief of Research and Development, Department of the Army and Commanding General, USACDC, for coordination and decision before incorporation into the final design.

ANNEX D

PREVIOUSLY PROVIDED PEWS COORDINATED TEST PROGRAM

ANNEX E

LOGISTICAL CONCEPT

SECTION VI

PLAN FOR LOGISTIC SUPPORT

6.1 Introduction. The PEWS AN/TRS-2(V) is a simple, compact, lightweight device to provide early warning of approaching personnel and vehicles to platoon and outpost size units.

6.2 Description. PEWS consists of the following components:

6.2.1 Detector, Anti-Intrusion DT-577(V)/TRS-2(V). A seismic/magnetic sensor which transmits activations over radio or wire link.

6.2.2 Receiver, Radio R-1808(V)/TRS-2(V). A fixed frequency receiver with visual display and aural alarm.

6.2.3 Sensor Interface, Wire Link MX-9738/TRS-2(V). An interface which connects to the receiver for wire link operation.

6.2.4 Carrying Case CY-7524/TRS-2(V). A case for the complete PEWS.

6.3 Support Concept.

a. The PEWS design minimizes field maintenance requirements. Sensors meet the requirement that they "Be of such low cost and simplified design and construction that a sensor which becomes defective can be considered a throw-away item." The receiver is a sealed unit meeting requirements for simplicity of operation, reliability, weight and durability. Based on the results of logistic support analysis (LSA) conducted during the ED phase and the results of DT-II/OT-II, all internal receiver repair will be accomplished at the depot level. The LSA showed this to be the alternative with the lowest operating and support costs for the expected range of receiver MTBFs. One other alternative (fault isolate to component at DS; fault isolate to module and part at GS) approached the depot repair alternative costs as MTBF decreased; however, this alternative would have increased R&D costs and unit production costs in order to achieve adequate maintainability characteristics while retaining acceptable reliability and performance levels. During DT-II/OT-II, there was only a single chargeable internal receiver electrical failure, which was attributed to a quality control deficiency, in over 3,200 test hours.

b. No special support considerations are required. The PEWS will be delivered by the contractor and stocked, stored and issued as a complete system. Each set will be identified as a variable configuration (i.e., (V1), (V2)) depending on the specific preset data transmission frequency; each sensor will include an uncoded code plug which must be encoded prior to issue. Individual end items, as well as code plugs and spare and repair parts, will be provisioned to support the established maintenance concept. For at least the first two (2) years after IOC, all failed items will be returned to the depot for analysis and disposition. Figure 6-1 represents a typical materiel flow diagram.

6.4 Maintenance Plan. Maintenance will be accomplished in accordance with the Maintenance Allocation Chart (MAC) (Table 6-1).

6.5 Support and Test Equipment.

a. Support and test equipment requirements are listed in Table 6.2

b. Test Set TS-3565/TRS-2(V) generates data signals required to test Receiver R-1808(V)/TRS-2(V). The maintenance concept of the test set has tentatively been established in accordance with Table 6-3; however, this concept will be reevaluated prior to fabrication of first article test units to assure compliance with the intent of HQDA Ltr 750-76-4, dated 22 December 1976, subject: Field Versus Depot Repair of Boards/Cards and Modules in Electronic Systems/Equipments.

6.6 Management. The ILSMT, chaired by an ILS who is designated by the PM, will be responsible for integrating all elements of logistic support. This team will include representation from activities responsible for the PEWS production, support, training, and deployment; contractor representation will be included.

6.7 Life Cycle Support Costs. Estimated yearly operating and support costs (constant FY 76 dollars) are as follows:

Total Per Year	$452,000
Personnel (Maint)	2,000
*Consumption	370,000
Depot Maint	15,000
Indirect	65,000

*Includes SRP, sensors and batteries, less wire

6.8 Schedule of Logistic Support Events. The key ILS events are presented in the following tabulation:

MILESTONE	DATE
Initial Production Testing (IPT) MTSP Available	4QFY78
IPT	1QFY79
MFP Complete	3QFY79
PV IPR	3QFY79
DA Doctrinal Pubs Approved	4QFY79
Final Qualitative and Quantitative Personnel Requirements Information (QQPRI) & MOS Decision	1QFY78
Training Aids & Lit Delivered	4QFY79
Authorization Document (TOE) Approved	2QFY77
Depot Maintenance Support Plan Approved	3QFY79
Adequate Skilled Operator & Maintenance Personnel Available	1QFY80
Repair Parts Fill	4QFY79
Technical Manuals & Repair Parts and Special Tools List (RPSTIL) Available	4QFY79
Special Tools; Test, Measurement and Diagnostic Equipment (TMDE) and Calibration Equipment Available	4QFY79
End Items & All Support Elements Certified for Issue	4QFY79
MET Teams & Technical Assistants Available	4QFY79
Equipment & Support Elements Shipped	4QFY79
Depot Support Ready	4QFY79
IOC Achieved	1QFY80

ANNEX F

REFERENCES/BIBLIOGRAPHY

1. Operational Test II of Platoon Early Warning System AN/TRS-2 ( ), February 1977, US Army Communications Electronics Board.

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4. Coordinated Test Program, Platoon Early Warning System (PEWS) March 1975, Project Manager Remotely Monitored Battlefield Sensor Systems.